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(54) TRANSMITTER AND RECEIVER FOR DEFINITION RECEPTION SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To enhance the efficiency of multiplexing, when a plurality of information source coded bit string are set in packets, ciphered, multiplexed and transmitted.

SOLUTION: This transmitter is configured with an information source coding section 1, a variable length packet assembling/scramble section 2, a priority multiplexer section 3, and an encipherment/priority multiplexing control section 4. The encipherment/priority multiplexing control section 4 controls the sections 3, 4 so that a multiplexed bit stream 104 has a scramble key updated at a larger time interval than a maximum multiplex delay time.
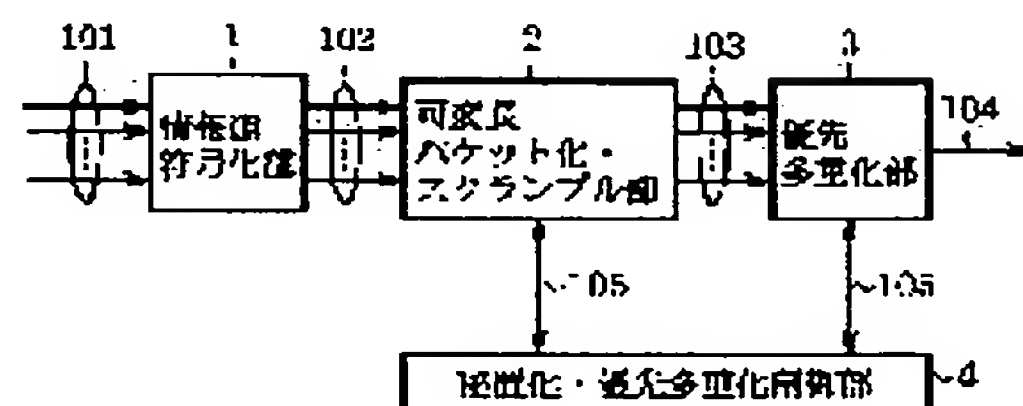
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[Claim 8] The conditional-access method transmission device according to claim 6 or Claim 7,

wherein a confidentialization/priority multiplexing control unit is operable to change and encrypt an encryption type as well as an encryption-using mode such as CBC mode and OFB mode, based on confidentialization priority.

[0029] FIG.3 is a figure that shows the structure of a variable length packet used by the first embodiment of the present invention.   201 is a packet start code that stores a unique word for identifying the leading part of the variable length packet, 202 is a packet identifier with a number attached that varies in each content stored in the packet, 203 is confidentialized information that notifies of confidentialized/non-confidentialized information, information for differentiating between even/odd keys used in confidentialization, and encryption-using modes such as CBC and OFB; 204 is an ECM identification number that notifies of the variable length packet's packet identifier number which stores the ECM for the confidentialization of the variable length packet concerned, 205 is the payload length which indicates the payload length of the variable length packet, 206 is a CRC attached to prevent an error check for the header section of the variable length packet as well as emulation of packet start code 201 when scramble processing is carried out, and 207 is the variable length packet payload that stores the encoded bit sequence.   Note that a plurality of ECMs are prepared which vary in type according to the content, the information source encoding mode or the like and the ECM type corresponding to the contents of the packet or the information source encoding mode is identified by ECM identification number 204.

[0030] At the time of confidentialization, types of encryption used in confidentialization, encryption-using modes such as CBC and OFB, confidentialized/non-confidentialized information, and so on are controlled per variable-length packet, according to the details of the content or the information source encoding mode per encoding unit, by a control signal 105, outputted from confidentialization/priority multiplexing control unit 4; this control information is written into a field of confidentialization information 203 in each variable-length packet.

[0031] For example, for video content, confidentialization/priority multiplexing control unit 4 controls as follows based on the priority level Pca below, prescribed for the information source encoding mode for confidentialization of the encoding unit:

Pca=1 : Confidentialize all encoding units.

Pca=2 : Confidentialize coding units except for intra-prediction mode coding units.

Pca=3 : Confidentialize only the coding units in bi-directional prediction mode.

Pca=4 : No confidentialization.

[0032] Likewise, for confidentialization for audio content and a diversity of data content, confidentialization/priority multiplexing control unit 4 controls confidentialization periods or non-confidentialization periods by a measure of a coding unit according to confidentialization priority. In addition, confidentialization/priority multiplexing control unit 4 controls confidentialization strength according to confidentialization priority, by changing the type of encryption used and changing encryption-using modes such as CBC mode and OFB mode. Note that for confidentialization, information related to confidentialization such as scramble keys that is not included in the confidentialization information 203 field of each variable length packet is stored and sent in the payload of a variable length packet as ECM.

[0033] Next, priority multiplexing unit 3 priority multiplexes variable length packet sequence 103 for each content and generates a multiplexed bit sequence 104 of a fixed bit rate (CBR). At this time, the multiplexing property at the time of priority multiplexing is controlled by control signal 105, based on the priority level related to multiplexing delays assigned to each content. The priority level related to multiplexing delays places ECM and control information at the highest priority. Also the priority level is increased for content that needs real-time transmission, and the priority level for content that does not need real-time transmission is decreased. Further, the same priority level is applied to a plurality of contents that need synchronous playback like video and audio accompanying this video.

[0034] Likewise, in addition to the control of the confidentialization priority level for every variable length packet as already mentioned, confidentialization/priority multiplexing unit 4 outputs control signal 105 which performs control of the update timing for scramble keys utilized in confidentialization, control of the ECM multiplexing timing and priority multiplexing control based on the priority level of multiplexing delays applied to each content and so on.